Claims

We claim:

1. A method for controlling total mercury emissions in a flue gas comprising:

providing a flue gas at a selected temperature and having a quantity of elemental mercury;

treating the flue gas to convert the elemental mercury to oxidized mercury with at least one of: chlorine and aqueous chlorine species; and

removing the oxidized mercury from the flue gas subsequent to and separately from the chlorine treatment step.

2. A method according to claim 1, wherein the aqueous chlorine species comprises an oxi-acid.

3. A method according to claim 2, wherein the removing mercury step comprises treating the flue gas with at least one of: hydrogen sulfide gas and an aqueous sulfide species.

4. A method according to claim 1, wherein the selected temperature of the flue gas is between 125°C and 200°C.

5. A method according to claim 1, wherein the removing mercury step comprises treating the flue gas with at least one of: hydrogen sulfide gas and an aqueous sulfide species.

6. A method according to claim 5, wherein the selected temperature of the flue gas is between 125°C and 200°C.

7. A method according to claim 2, wherein the selected temperature of the flue gas is between 125°C and 200°C.

8. A method according to claim 2, wherein the oxi-acid is at least one of: Cl_2O, ClO_2, ClO_4, ClO, HClO, $HClO_2$, $HClO_3$, and $HClO_4$.

9. A method according to claim 8, wherein the selected temperature is selected to allow use of aqueous species and low-temperature gases for use in the treating the flue gas to convert the elemental mercury to oxidized mercury.

10. A method according to claim 1, wherein the selected temperature is sufficient to allow use of aqueous species and low-temperature gases in the treating the flue gas to convert the elemental mercury to oxidized mercury.

11. A method according to claim 10, wherein substantially all of the elemental mercury is converted to oxidized mercury.

12. A method according to claim 1, wherein substantially all of the elemental mercury is converted to oxidized mercury.

13. A method according to claim 2, wherein substantially all of the elemental mercury is converted to oxidized mercury.

14. A method according to claim 4, wherein substantially all of the elemental mercury is converted to oxidized mercury.

15. A method according to claim 5, wherein substantially all of the elemental mercury is converted to oxidized mercury.

16. A method according to claim 8, wherein substantially all of the elemental mercury is converted to oxidized mercury.

17. A method according to claim 9, wherein substantially all of the elemental mercury is converted to oxidized mercury.

18. A method according to claim 1, wherein the aqueous chlorine species comprises a salt of an oxi-acid.